

BLUEPRINT FOR ACTION

Workshop on the Design of the

National Network for Manufacturing Innovation

Education and Workforce Development January 16, 2013

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Education and Workforce Development

Please make note of your reactions to this presentation to bring to this afternoon's café discussions.



Education and Workforce Development

Here is an overview of what was heard through the RFI and Workshops crowd sourcing, showing areas of consensus and differing views.



Education and Workforce Development RFI Overview Topics

- How could the Institutes –
 1. support advanced manufacturing workforce development at all educational levels?
 2. ensure that advanced manufacturing workforce development activities address industry needs?
 3. leverage and complement other education and workforce development programs?
 4. assess Institute performance and impact on education and workforce development?
 5. integrate R&D activities and education to best prepare the current and future workforce?



Education and Workforce Development

RFI Overview Topic One

How could Institutes support advanced manufacturing workforce development at all educational levels?



Q1. How could Institutes support advanced manufacturing workforce development at all educational levels?

- Bring manufacturing to students, teachers, and schools. Example: bring 3D printers to schools.
- Bring students and teachers to manufacturing and provide hands-on learning. Industry partners can host them, or Institutes can develop on-site fab labs. Such could be in the form of summer programs, in-school, and out of school.
- Offer free online training courses (based on Khan Academy model).
- Use video games for recruiting.
- Educate children before 7th and 8th grade so they don't track out of pre-algebra & courses for STEM careers.



Q1. How could Institutes support advanced manufacturing workforce development at all educational levels?

- Gender differences need to be acknowledged and projects design accordingly. For example, design projects can be a toothbrush; not a car transmission.
- Internships are critical for college-age students.
- Incorporate manufacturing into the curriculum and develop materials (high schools & community colleges).
- Change the perception of manufacturing with youth, students, and parents.
- Fund scholarships at associate, undergraduate and graduate levels.



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RFI Overview Topic Two

How could Institutes ensure that advanced manufacturing workforce development activities address industry needs?



Q2. How could Institutes ensure that advanced manufacturing workforce development activities address industry needs??

- The Institutes should have industry representation in the governance.
- As new technologies enter industries that require manufacturing, new sets of skills are required. The Institutes need to take the pulse of regional industry needs and ensure that lower skill workers are getting the training they need to enter middle skill jobs.
- An important focus should be on unemployed, underemployed, and displaced workers, as well as returning military personnel.
- Master's Degree programs can be developed at regional universities to address emerging needs.



Education and Workforce Development

RFI Overview Topic Three

How could Institutes and the NNMI leverage and complement other education and workforce development programs?



Q3. How could Institutes leverage and complement other education and workforce programs?

- The NNMI could leverage and complement other education and workforce development programs by benchmarking best practices. TechShop (a membership-based workshop that provides access to tools and instruction), Dept. of Labor workforce development programs and SME videos were identified as models.
- The Institutes could each establish a library so members can easily learn about complementary education and workforce development programs, and federally funded programs such as NSF's Advanced Technology Education Program and NIST's Manufacturing Extension Partnerships.
- Industry partners could publish information that details the types of skills they would like to see in their current and future employees and the IMIs. IMIs could bring in high-profile speakers and develop seminars/programs that piggyback on regional events.
- The Institutes could also establish an Office of Workforce Development Advisory Council to ensure that industry, academia, and government labs are collaborating and supporting one another in education and workforce development.
- The Institutes could partner with jobs centers to establish training pathways for displaced workers. They could also engage community colleges, vocational/technical schools, skilled trade organizations, trade unions, and internship and apprenticeship programs.



Education and Workforce Development

RFI Overview Topic Four

What measures could assess Institute performance and impact on education and workforce development?



Q4. What measures could assess Institute performance and impact on education and workforce development?

- The institutes could take measures of employment, either from number of employers that hired new workers, numbers of student placements in industry, job performance, etc.
- The institutes could assess certification levels in relevant fields. Assessment could be performed with a five-year follow-up. A useful measure of performance and impact could be the number of courses offered by the IMIs. ABET outcomes could also be used. Participants noted the importance of publicizing the impact of the Institutes, to demonstrate their value to stakeholders and voters.



Education and Workforce Development

RFI Overview Topic Five

How might institutes integrate R&D activities and education to best prepare the current and future workforce?



Q5. How might institutes integrate R&D activities and education to best prepare the current and future workforce?

- Students at all levels should be involved in industry-driven R&D programs. Industry participants pointed out that they have good success using internships, co-ops, and apprenticeships as a way to prepare their workforce.
- Teacher/faculty externships were also proposed, as were the use of “sabbaticals” for industry workers to teach in schools. The Institute could offer continuing education units and training focused on specific employer needs. They might also offer a prize or award for completing an NNMI project. It was noted that teaching hospitals are a useful model: the institutes could connect industry with educators and provide students opportunities for real-world experiences.



Education and Workforce Development Preliminary Design Tenets

The NNMI will launch a government-industry-academia partnership that galvanizes the resources of all stakeholders to achieve the critical mass of efforts needed to effectively address this TRL 4 – 7 gap.



Education and Workforce Development

Preliminary Design Tenets

- Each Institute will assess skills and certifications needed.
- Institutes will assure educational opportunities to improve and expand the manufacturing workforce, including K-12 programs, internship opportunities, skills certification, community college engagement, university collaboration, graduate students, post-doctoral students, and retraining to meet the requirements set forth by an Institute's mission.



Education and Workforce Development

Preliminary Design Tenets

- Institutes will focus on both the technical and degreed engineering workforce.
- Applied research, development, and demonstration projects will consider the potential to collaborate with educators as part of the design.



Education and Workforce Development

Preliminary Design Tenets

- Because institutes will foster innovative methodologies and practices for increasing the capabilities and capacity of supply chain expansion and integration, skills in non-engineering fields will be of secondary concern and addressed through strategic partnerships that impact the larger industrial complex.



Education and Workforce Development Preliminary Design Tenets

- Many SMEs tend to be early adopters of transformational technology, and they are well-positioned to innovate and produce jobs. This makes their involvement in Institutes essential for maximizing industry and economic impacts. Accordingly, they have a high potential to work with colleges and schools in meeting the education and training objectives of the IMIs.



Education and Workforce Development

Preliminary Design Tenets

- Institutes will provide shared facilities to local industry, especially SMEs and startups, with the goal of scaling up laboratory demonstrations and making technologies ready for manufacture. To support education and training objectives of each IMI, facility sharing must include planning for the uses of facilities for education and training—both for advanced-knowledge workers and mid-level technicians.



Education and Workforce Development

Two Café Questions

- How can an Institute exercise industry leadership with other key stakeholders in workforce training and development?
- How should an Institute be responsive to a region's workforce development and training priorities, and pursue initiatives that are responsive to the nation's needs?

